

An avifaunal survey of the Trans-Mara Forest, Kenya

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The Mau Forest complex forms the largest continuous tract of indigenous forest in Kenya. Collectively its five administrative blocks (the Eastern, Western and South-Western Mau, Trans-Mara and Ol Pusimoru Forests: see Fig. 1) have a gazetted area of some 244 000 ha, about 14.5 per cent of the total gazetted forest area in the country (Wilson 1988a). However, the flora and fauna of this important group of forests remains little-known (Wilson 1988b). While the avifauna of the high (2700–3000 m) and floristically distinct Eastern Mau was described by Sessions (1966, Britton 1979), avifaunal studies elsewhere appear to be limited to short lists (one more than forty years old) of birds from two sites in the South-Western Mau (Toschi 1946, Gichuki *et al.* 1988). Observer coverage for square 61 of the *Bird Atlas of Kenya*, in which most of the Mau Forest complex lies, is estimated as better than 75 per cent for only one of the four quarter square degrees (Lewis & Pomeroy 1989).

This paper reports the results of bird survey work conducted in the Trans-Mara Forest during January–February 1990, when some comparative data were also collected in the South-Western Mau. The survey forms part of a larger environmental study carried out in these forests.

The Trans-Mara Forest

This forest, in Narok District, south-west Kenya, covers about 35 000 ha (14 per cent of the total complex area) in the south-west of the Mau complex. Altitude ranges from about 2100 m in the west to 2400 m near the eastern boundary. Following this shallow gradient, typical moist lower montane forest grades upwards through a transition zone of 'poor' forest (Kerfoot 1964) into bamboo/forest mixture or pure stands of bamboo *Arundinaria alpina* above about 2300 m. Within the gazetted forest boundary part of the bamboo zone has been cleared recently to give way to tea plantations, while the character of the forest at lower altitudes has been substantially changed by extensive and destructive logging that took place from 1979 to 1986 (J. Howell, pers. comm.). Dominant large timber trees once included species such as *Polyscias kikuyuensis*, *Albizia gummifera* and *Olea hochstetteri*, but few specimens of these or other timber species now remain. Timber removal has taken place over most of the area of the Trans-Mara and part of the South-Western Mau, up to about 12 km either side of the existing Olenguruone-Silibwet road. The forest is most degraded near the western boundary, with little high canopy cover. Further east, more tall trees remain and there has been substantial regrowth of non-timber species such as *Neoboutonia macrocalyx* and *Tabernaemontana stapfiana*. Removal of the canopy trees in many places has resulted in a dense and tangled undergrowth layer, dominated by *Mimulopsis* sp. and *Piper capense*, giving way to *Acanthus eminens* at higher altitudes. In damper sites, especially valley bottoms, *Brillantiasia* is common in the understory and extensive stands of tree-ferns *Cyathea manniana* also occur.

The less-disturbed South-Western Mau appears to have a somewhat different forest structure, although with similar dominant species. In the areas visited, the forest was more layered with a distinct understory of *Brillantiasia* and *Neoboutonia*, and was generally much more open at ground level due to the better shade. Although rarely com-

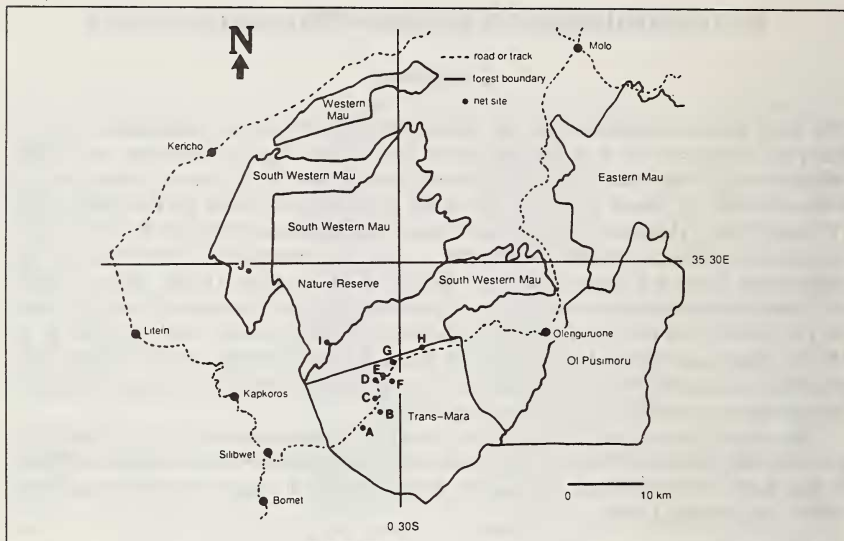


Fig. 1. Sketch map of the Mau Forest complex showing net-sites worked in the Trans-Mara and South-Western Mau

plete, the high canopy was less broken than in the Trans-Mara (cf. Kerfoot 1964).

Excluding the bamboo zone, forest structure in the Trans-Mara appears rather uniform, despite gradients in altitude and disturbance. Differentiation between ridgetop, hillslope and valley forest types is probably poor due to the relatively smooth topography, with shallow valleys and broad ridges, and has been further blurred by logging.

Methods

Survey work was carried out in the Trans-Mara Forest Reserve over 22 days between 28 January and 23 February 1990. Brief visits were also made to the South-Western Mau Nature Reserve (20–22 February) and Forest Reserve (24–26 February) (Fig. 1).

Mist-nets were used at eight sites within the Trans-Mara (A to H in Fig. 1), covering a range of altitude and forest disturbance. As well as montane forest, the sites sampled two distinct habitats, tree-fern forest (site G) and bamboo (site H). For ease of access, all sites were close to the alignment of the existing Olenguruone-Silibwet road (Fig. 1). Two additional sites were operated in the comparatively undisturbed forest of the South-Western Mau, one at low altitude in the Forest Reserve (Kipteget River, 2020 m) and one at high altitude in the Nature Reserve (4 km NE of Bosta Hill, 2320 m; Fig. 1, sites J and I respectively).

Most net sites made use of existing narrow trails in the forest; two used transects recently cut for vegetation measures. At each site eight to ten small-mesh, 3-m high nets were set, representing 96–141 m in total length. Wherever possible nets were set in a line with only small gaps between them. Nets were opened for two morning (dawn to about 10:30) and two evening (16:30 until dusk) sessions at the first five sites, and for two morning sessions only thereafter because of deteriorating weather. At two sites nets

were operated for only one full session because of rain. All birds caught were ringed.

January and February are usually the driest months in the Mau Forest (Kerfoot 1964), although some rain is always recorded. Conditions in the Trans-Mara were dry on arrival in late January, but deteriorated steadily over the next month. By the last week in February heavy rain occurred every afternoon, often continuing throughout the night and following morning.

Vegetation measures were made at each net site over five quadrats, positioned alternately 5 m to left and right of the net trail from the end of every second net (starting with net 1). The percentage cover of herb (<0.5 m in height), leaf litter and soil were recorded in a 1 x 1 m square, and the percentage cover of vegetation in four layers (0.5–1 m, 1–3 m, 3–8 m and >8 m) in a 3 x 3 m square. Results were averaged for each net site. Vegetation at two sites was not assessed because of bad weather. Disturbance at each site was rated subjectively on a scale of 0 (none) to 10 (highly disturbed).

Casual observations were made at any time throughout the forest. In addition, to obtain measures of relative abundance for canopy species (which are not sampled by mist nets) a series of timed species counts was carried out (Pomeroy & Tengecho 1986). Counts followed the method outlined by Pomeroy & Tengecho (1986), with two modifications: following preliminary trials which showed that few species were added during the last third of a count, the duration of each count was reduced to 40 min from 60 min, and only birds seen or heard calling within 25 m of the observer were listed. This latter modification was designed to prevent inflated measures of relative abundance being calculated for conspicuous species (see Pomeroy 1989). For each count, each species was scored according to when it was recorded (4 if in the first ten minutes, 3 if in the next ten minutes and so on) and scores were averaged over all counts to give a simple relative abundance index. These counts ignored birds moving below 5 m in the vegetation, and no indices were calculated for inconspicuous mid-level species such as greenbuls that were occasionally seen high in the canopy.

Ten counts were made between 30 January and 16 February 1990 at various points along the forest track and various times of day. In all counts I walked slowly along the road while scanning the trees. Deteriorating weather forced the series to be cut short, so the results should be considered provisional: ideally, 15 counts or more should be conducted over a longer period to provide a good picture of a regional avifauna (Pomeroy & Tengecho 1986).

Results

Species recorded

Ninety-two species were recorded within the Trans-Mara forest block (Table 1) of which 82 (89 per cent) can be considered forest or forest-edge birds (Britton 1980). The observations provide 55 new records for the *Bird Atlas of Kenya*, of which 22 are range extensions. Only one additional species (Broad-billed Roller *Eurystomus glaucurus*) was recorded during observation and mist-netting in the South-Western Mau.

Undergrowth species

In all, 328 birds were captured in the Trans-Mara and another 64 in the South-Western Mau in 10 000 m² of netting. Capture rates varied between 3.1 to 5.1 birds per 100 m² h⁻¹ in the forest but were much lower (1.4/100 m² h⁻¹) in the bamboo. Excluding the bamboo site, for which no vegetation measures were available, capture rates across sites were significantly positively correlated with vegetation cover between 0.5 and 1 m

Table 1. Annotated list of species recorded

Species are listed by their number in the *Bird Atlas of Kenya* (Lewis & Pomeroy 1989). New records for atlas squares 61C and 61D are indicated under the appropriate columns as follows: **, first record; *, first recent (post-1970) record; PB, first probable breeding record; B, first definite breeding record. Other columns: N_{TM}, number caught in Trans-Mara forest; N_{SW}, number caught in SW Mau forest; BZ, bamboo zone: +, recorded, - not recorded.

	61C	61D	N _{TM}	N _{SW}	BZ
Scopidae (Hamerkop)					
44 Hamerkop <i>Scopus umbretta</i> Along roadway.	-	-	-	-	-
Accipitridae (birds of prey)					
116 Mountain Buzzard <i>Buteo tachardus</i> Especially common in bamboo zone.	-	*	-	-	+
121 Long-crested Eagle <i>Lophaetus occipitalis</i>	-	*	-	-	-
122 Crowned Eagle <i>Stephanoaetus coronatus</i>	PP	-	-	-	-
135 Black Kite <i>Milvus migrans</i>	-	*	-	-	-
Phasianidae (quails, francolins)					
161 Scaly Francolin <i>Francolinus squamatus</i>	B	-	-	-	-
Numididae (guineafowls)					
180 Helmeted Guineafowl <i>Numida meleagris</i> Occasional records throughout forest.	-	-	-	-	-
Scolopacidae (sandpipers, etc.)					
262 Green Sandpiper <i>Tringa ochropus</i> Ponds along roadway.	-	-	-	-	-
Columbidae (pigeons, doves)					
325 Olive Pigeon <i>Columba arquatrix</i>	-	-	-	-	+
326 Bronze-naped Pigeon <i>Columba delegorguei</i>	-	-	-	-	-
330 Red-eyed Dove <i>Streptopelia semitorquata</i> Only in bamboo zone.	-	-	-	-	+
334 Lemon Dove <i>Aplopelia larvata</i>	**	-	9	2	-
335 Tambourine Dove <i>Turtur tympanistria</i>	B	**	9	1	-
340 Green Pigeon <i>Treron australis</i>	-	-	-	-	-
Musophagidae (turacos)					
358 Hartlaub's Turaco <i>Tauraco hartlaubi</i>	-	*	-	-	+
Cuculidae (cuckoos)					
365 Red-chested Cuckoo <i>Cuculus solitarius</i>	-	-	-	-	+
366 Black Cuckoo <i>Cuculus clamosus</i>	-	-	-	-	-
372 Emerald Cuckoo <i>Chrysococcyx cupreus</i>	**	**	-	-	+

	61C	61D	N _{TM}	N _{SW}	BZ
Strigidae (owls)					
389 African Wood Owl <i>Ciccaba woodfordii</i>	-	-	-	-	-
392 Red-chested Owllet <i>Glaucidium tephronotum</i>	**	-	-	-	-
Calling shortly before dawn on most mornings.					
Caprimulgidae (nightjars)					
398 Montane Nightjar <i>Caprimulgus poliocephalus</i>	-	-	-	-	+
Along roadway. Not calling.					
Meropidae (bee-eaters)					
444 Cinnamon-chested Bee-eater <i>Merops oreobates</i>	-	-	-	-	-
Common along roadway; nest-holes in banks.					
Phoeniculidae (wood hoopoes)					
461 White-headed Wood-hoopoe <i>Phoeniculus bollei</i>	**B	-	-	-	-
Bucerotidae (hornbills)					
464 Black and White Casqued Hornbill	-	*	-	-	-
<i>Bycanistes subcylindricus</i>					
474 Crowned Hornbill <i>Tockus alboterminatus</i>	-	-	-	-	-
One record only in highly disturbed forest.					
Capitonidae (barbets, tinkerbirds)					
489 Grey-throated Barbet <i>Gymnobucco bonapartei</i>	-	-	-	-	-
495 Yellow-rumped Tinkerbird <i>Pogoniulus bilineatus</i>	-	*	1	-	+
496 Yellow-billed Barbet <i>Trachylaemus purpuratus</i>	**	-	-	-	-
Indicatoridae (honeyguides)					
500 Black-throated Honeyguide <i>Indicator indicator</i>	**	-	-	-	-
One record, calling.					
Picidae (woodpeckers)					
515 Fine-banded Woodpecker <i>Campethera tullbergi</i>	-	-	-	-	-
519 Cardinal Woodpecker <i>Dendropicops fuscescens</i>	-	-	-	-	-
Hirundinidae (swallows)					
557 Mosque Swallow <i>Hirundo senegalensis</i>	-	-	-	-	-
One record, highly disturbed forest.					
564 Black Rough-wing <i>Psalidoprocne pristopectera</i>	PB	-	-	-	+
Oriolidae (orioles)					
570 Montane Oriole <i>Oriolus percivali</i>	**	*	-	-	-
Paridae (tits)					
583 White-bellied Tit <i>Parus albiventris</i>	-	-	-	-	-

	61C	61D	N _{TM}	N _{SW}	BZ
Timaliidae (babblers)					
589 Pale-breasted Illadopsis <i>Trichastoma rufipennis</i> One captured (see Appendix).	**	-	1	-	-
591 Mountain Illadopsis <i>Trichastoma pyrropterum</i>	*PB	-	19	2	-
594 African Hill Babbler <i>Alcippe abyssinica</i>	PB	-	12	-	-
Campephagidae (cuckoo shrikes)					
604 Black Cuckoo Shrike <i>Campephaga flava</i> Few records.	-	-	-	-	-
607 Grey Cuckoo Shrike <i>Coracina caesia</i>	-	*	-	-	-
Pycnonotidae (bulbuls)					
609 Common Bulbul <i>Pycnonotus barbatus</i>	-	-	1	-	+
613 Slender-billed Greenbul <i>Andropadus gracilirostris</i>	**	-	-	-	-
615 Mountain Greenbul <i>Andropadus tephrolaemus</i>	**PB	*	14	5	-
618 Yellow-whiskered Greenbul <i>Andropadus latirostris</i>	PB	*	29	5	-
626 Placid Greenbul <i>Phyllastrephus placidus</i>	**PB	*	29	3	+
Turdidae (thrushes)					
662 White-starred Forest Robin <i>Pogonocichla stellata</i>	B	-	31	4	+
663 Brown-chested Alethe <i>Alethe poliocephala</i>	**	-	3	5	-
665 Snowy-headed Robin Chat <i>Cossypha niveicapilla</i>	**PB	-	2	2	-
670 Robin Chat <i>Cossypha caffra</i>	PB	-	1	-	-
672 Equatorial Akalat <i>Sheppardia aequatorialis</i>	*PB	-	7	8	-
678 Northern Olive Thrush <i>Turdus abyssinicus</i>	PB	-	9	2	-
680 Abyssinian Ground Thrush <i>Turdus piaggiae</i>	**PB	-	18	4	-
Sylviidae (warblers)					
684 Cinnamon Bracken Warbler <i>Bradypterus cinnamomeus</i>	**	*	8	-	+
685 Evergreen Forest Warbler <i>Bradypterus barratti</i>	**	-	4	-	-
703 Mountain Yellow Warbler <i>Chloropeta similis</i>	**	-	2	-	-
708 Blackcap <i>Sylvia atricapilla</i>	-	-	29	2	-
712 Brown Woodland Warbler <i>Phylloscopus umbrovirens</i>	PB	-	4	-	-
714 Chiffchaff <i>Phylloscopus collybita</i>	**	-	-	-	-
715 Willow Warbler <i>Phylloscopus trochilus</i> One record.	-	-	-	-	-
746 Banded Prinia <i>Prinia bairdii</i>	*B	-	16	-	-
751 Black-throated Apalis <i>Apalis jacksoni</i> One record.	-	-	-	-	-
754 Grey Apalis <i>Apalis cinerea</i>	**	-	-	-	-
756 Chestnut-throated Apalis <i>Apalis porphyrolaema</i>	-	-	-	-	-
757 Black-collared Apalis <i>Apalis melanocephala</i> One record in highly disturbed forest.	-	-	1	-	-
759 Black-faced Rufous Warbler <i>Bathmocercus cerviniventris</i> One record in dense tree-fern forest.	PB	-	1	4	-

	61C	61D	N _{TM}	N _{sw}	BZ
769 White-browed Crombec <i>Sylvietta leucophrys</i>	-	-	3	-	-
Muscicapidae (flycatchers)					
782 Dusky Flycatcher <i>Muscicapa adusta</i>	-	-	-	-	-
790 White-eyed Slaty Flycatcher <i>Melaenornis chocolatina</i>	-	-	1	-	-
799 Chin-spot Batis <i>Batis molitor</i>	-	-	-	-	-
803 Black-throated Wattle-eye <i>Platysteira peltata</i>	PB	-	4	-	-
809 White-tailed Crested Flycatcher <i>Trochocercus albonotatus</i>	PB	-	8	3	-
812 Paradise Flycatcher <i>Terpsiphone viridis</i>	-	-	-	-	-
Motacillidae (wagtails, pipits)					
829 Cape Wagtail <i>Motacilla capensis</i> Along roadway.	-	-	-	-	-
830 Yellow Wagtail <i>Motacilla flava</i> Along roadway.	-	-	-	-	-
Malaconotidae (bush shrikes)					
847 Lühder's Bush Shrike <i>Laniarius luehderi</i>	PB	-	2	-	-
849 Tropical Boubou <i>Laniarius ferrugineus</i>	-	-	-	-	-
853 Many-coloured Bush Shrike <i>Malaconotus multicolor</i>	**	-	-	-	-
Sturnidae (starlings)					
875 Stuhlmann's Starling <i>Poeoptera stuhlmanni</i>	-	-	-	-	-
887 Waller's Chestnut-winged Starling <i>Onychognathus walleri</i>	-	-	-	-	-
897 Sharpe's Starling <i>Cinnyricinclus sharpii</i>	-	-	-	-	-
Nectariniidae (sunbirds)					
902 Collared Sunbird <i>Anthreptes collaris</i>	-	-	-	-	-
921 Northern Double-collared Sunbird <i>Nectarinia preussi</i>	-	-	-	-	-
929 Olive Sunbird <i>Nectarinia olivacea</i>	-	-	13	9	-
934 Green-headed Sunbird <i>Nectarinia verticalis</i>	-	-	-	-	-
Zosteropidae (white-eyes)					
937 Yellow White-eye <i>Zosterops senegalensis</i>	PB	*	18	2	+
Ploceidae (weavers)					
960 Baglafaecht Weaver <i>Ploceus baglafaecht</i> Along roadway and in disturbed forest.	-	-	-	-	-
964 Black-billed Weaver <i>Ploceus melanogaster</i>	PB	-	6	-	-
965 Brown-capped Weaver <i>Ploceus insignis</i>	PB	-	-	-	-
Estrildidae (waxbills)					
1005 Grey-headed Negrofinch <i>Nigrita canicapilla</i> One record.	-	-	-	-	-

	61C	61D	N _{TM}	N _{SW}	BZ
1016 Abyssinian Crimson-wing <i>Cryptospiza salvadorii</i>	-	-	13	1	-
1036 Black-crowned Waxbill <i>Estrilda nonnula</i>	-	-	-	-	-
Along roadway.					
Fringillidae (buntings, etc.)					
1063 Thick-billed Seed-eater <i>Serinus burtoni</i>	-	-	-	-	-
Few records.					
1064 Streaky Seed-eater <i>Serinus striolatus</i>	-	-	-	-	-
Disturbed forest only, few records.					

(Spearman's $r = 0.71$, $n = 8$, $P < 0.05$) but not with any other vegetation feature. The only vegetation feature strongly associated with disturbance was canopy cover above 8 m ($r = -0.80$, $n = 8$, $P < 0.02$). A simple measure of species diversity calculated for each site, the Shannon index (Krebs 1978), was also negatively correlated with cover above 8 m ($r = -0.82$, $n = 8$, $P = 0.01$) but showed no significant relationship with disturbance *per se* ($r = -0.53$, $n = 9$, $P > 0.15$).

It was difficult to relate the distribution of undergrowth species to vegetation measures in finer detail. Most species were widely distributed across sites, although some common species such as Brown-chested Alethe and Evergreen Forest Warbler had an inexplicably patchy distribution. Three species characteristic of disturbed forest and scrub, the Common Bulbul, Robin Chat and White-eyed Slaty Flycatcher, were caught only at the most disturbed and open site (site A). Yellow-whiskered, Mountain and Placid Greenbuls, usually among the most frequently caught species, were almost absent at this site (only one Yellow-whiskered Greenbul captured, none of any species seen) suggesting they are mainly restricted to the better-preserved forest. The Black-faced Rufous Warbler was clearly confined to the least disturbed areas. It was captured and seen at both sites in the South-Western Mau (I and J), where it appeared common and conspicuous in dense shaded undergrowth, but none was seen in the Trans-Mara and only one was caught, in a patch of dense undisturbed tree-fern at site G.

Several species appeared to show altitudinal limitation. Britton (1980) records the Snowy-headed Robin Chat and Equatorial Akalat up to 2000 m and 2200 m respectively. In the Trans-Mara they were caught only at the two lowest sites (A and B, 2200 m and 2240 m). They were recorded again in less disturbed forest in the South-Western Mau at Kipteget River (J, 2000 m) but not at Bosta (I, 2320 m). The White-tailed Crested Flycatcher was caught at every forest site except the two lowest ones (J and A, 2000 m and 2200 m); however, it is known in Kakamega Forest from as low as 1650 m (Mann 1980). None of these species is likely to have been overlooked at sites where they were present.

Canopy species

The relative abundance of canopy species, calculated from timed species counts, is shown in Table 2. The three commonest species (Black Rough-wing Swallow, Cinnamon-chested Bee-eater and Common Bulbul) all forage mainly over or along the road (where the swallows and bee-eaters also breed), so these indices do not give an accurate picture of their relative numbers over the forest as a whole. No such bias should exist for

Table 2. *The relative abundance of canopy species in the Trans-Mara forest as indicated by timed species counts along the roadway (see text for details). The maximum abundance index is 4.0*

Abundance index	Species
3.3	Black Rough-wing Swallow
2.8	Common Bulbul
2.6	Cinnamon-chested Bee-eater
2.5	Chestnut-throated Apalis
2.0	Yellow-rumped Tinker-bird
2.0	Blackcap
1.5	Yellow White-eye
1.4	Olive Thrush
1.4	Chin-spot Batis
1.2	Montane Oriole
1.1	White-headed Wood Hoopoe
1.0	Dusky Flycatcher
0.9	Northern Double-collared Sunbird
0.8	Sharpe's Starling
0.8	Grey Cuckoo Shrike
0.7	Red-chested Cuckoo
0.7	White-eyed Slaty Flycatcher
0.6	Fine-banded Woodpecker
0.6	Grey Apalis
0.5	Brown Woodland Warbler
0.4	Yellow-billed Barbet
0.4	Slender-billed Greenbul
0.3	Collared Sunbird
0.3	Brown-capped Weaver
0.2	Hartlaub's Turaco
0.2	Waller's Chestnut-winged Starling
0.2	Emerald Cuckoo
0.2	White-browed Crombec
0.2	Chiffchaff
0.2	Green-headed Sunbird
0.1	Grey-throated Barbet
0.1	Black-fronted Bush Shrike

the remaining species. The results indicate the advantage of even a short sequence of counts over simple observation: for instance, Red-chested Cuckoos were heard calling almost constantly, but their true numbers (as the counts suggest) must be relatively small. Note that three species, Yellow White-eye, Blackcap, and Northern Olive Thrush, were commonly recorded both in counts and in mist-nets (Tables 1 and 2).

Discussion

In spite of its disturbed state, the Trans-Mara forest still supports a diverse avifauna. Eleven of the 82 forest species recorded there (15 per cent) are distinctly western in their affinities, namely the Red-chested Owllet, Grey-throated Barbet, Yellow-billed Barbet, Mountain Illadopsis, Snowy-headed Robin Chat, Equatorial Akalat, Banded Prinia, Black-faced Rufous Warbler, Lühder's Bush Shrike, Stuhlmann's Starling and Black-crowned Waxbill. The Red-chested Owllet has been recorded in the Kikuyu Escarpment forest (Taylor & Taylor 1988) and the Mountain Illadopsis in the Aberdares (Britton 1980), but otherwise none of these species is known east of the Rift Valley in Kenya. In terms of global conservation, all these species have populations in other parts of their range, chiefly in Uganda and eastern Zaïre. However, recent information on their status is lacking and several are probably uncommon throughout their range (D.E. Pomeroy, pers. comm.). In addition, these western species are of special interest within Kenya because the other forests in which they occur are small, fragmented and increasingly degraded.

The apparent presence of Pale-breasted Illadopsis in the Trans-Mara is surprising and needs confirmation (see Appendix). This species has a disjunct distribution, with the nominate race reaching Kenya at Kakamega and South Nandi while the race *distans* occupies forests 700 km away on the eastern arc mountains in Tanzania (Britton 1980). Significantly, the species has recently been discovered on the forest island of Ol Doinyo Orok, almost half-way between these two populations (Bennun *et al.* 1986). The Ol Doinyo Orok birds, like the individual caught in the Trans-Mara, appeared closer to *distans* than to the nominate race. The Ol Doinyo Orok record is at 1800 m and the altitudinal limit elsewhere in Kenya is at about 1700 m (Britton 1980, Mann 1980), compared to 2240 m for the Trans-Mara record. However, there is a single record in the Cherengani at 2300 m (Britton 1980). This, together with the Trans-Mara record, suggests both that this species may be frequently overlooked and that it may range considerably higher than has been thought.

Some 23 additional forest or forest-edge species previously recorded from atlas square 61C (Lewis & Pomeroy 1989), which includes much of the Trans-Mara and the South-Western Mau, were not found during the present survey. Additional work will no doubt add many of these to the Trans-Mara list, particularly those that are inconspicuous (e.g. Moustached Green Tinker-bird, Purple-throated Cuckoo-shrike) or that vary in abundance through seasonal altitudinal migration (e.g. Narina's Trogon). Others, especially those whose main ranges are at higher or lower altitudes, or that are known only from old records, may never have occurred in the Trans-Mara itself. There are nonetheless some surprising absences, including Crested Guinea-fowl (its place apparently taken by the Helmeted, usually a woodland bird), African Goshawk and Doherty's Bush Shrike. The presence of Red-fronted Parrot would also be expected, although it has not yet been recorded from this atlas square. It is clear that habitat modification has had some effect on species composition, with the encroachment of edge species along the road and western margins; such infiltration probably accounts for the negative correlation between undergrowth species diversity and high canopy cover. Most undergrowth species appear to have adapted surprisingly well to the altered forest structure, but the effects on canopy birds are less clear-cut; the possibility of local extinction in some cases due to forest destruction cannot be ruled out. Further study of the entire Mau complex should illuminate these issues, which are of considerable importance for bird conservation in this and other East African forests

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Appendix

Pale-breasted Illadopsis *Trichastoma rufipennis*

An illadopsis caught on 15 February 1990 in disturbed forest at 2240 m, and photographed, described and released, was immediately recognized as different from the examples of the Mountain Illadopsis *T. pyrrhopterum* caught at other sites. Field notes were as follows:

“Much browner than Mountain Illadopsis. Throat contrasting white. Upperparts including crown drab olivaceous brown. Cheeks greyer with olivaceous edges to feathers. Flanks, sides of chest, under tail coverts and lower belly similar to upperparts, slightly more olivaceous. Belly washed paler, not white. Centre of chest greyer, like cheeks, but with an olivaceous wash to tips so that grey not very clear. Eye brown, legs dark grey, toes yellowish-grey.”

The main differences from Mountain Illadopsis were in the brown crown, brown sides of chest, paler grey central chest and conspicuously contrasting white throat. Its combination of characteristics appeared to fit no other Kenyan Illadopsis, a conclusion borne out by examination of specimens in the collection of the National Museums of Kenya. However, two specimens of *T. rufipennis* from Amani, East Usambaras, Tanzania (the endemic race *distans*) bore an extremely close resemblance to the captured bird. All characteristics were very similar except the colour of the lower belly, which was pale in the Tanzanian specimens and brownish in the Trans-Mara bird. Specimens of *rufipennis* from Kakamega have an indistinct brownish band across the chest, quite different from the Trans-Mara individual. The identification of the Trans-Mara Illadopsis as *T. rufipennis* seems justified on the basis of this examination, but must remain provisional in the absence of a specimen. Further study is required to establish its affinities and those of *T. rufipennis* from Ol Doinyo Orok (Bennun *et al.* 1986).